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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/960,560	09/21/2001	Samuel W. Sheng	01-319 / 1496.00134	5708

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EXAMINER

ENG, GEORGE

ART UNIT	PAPER NUMBER
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2643

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/960,560	Applicant(s) SHENG ET AL.	
	Examiner George Eng	Art Unit 2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/7/2005 has been entered.

Response to Amendment

2. This Office action is in response to the amendment filed 3/7/2005.

Drawings

3. The drawings are objected to because figure 6, step 214, "the capacitor array 154" should be --the digital switched capacitor array 160-- to be corrected. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

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consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1, 9 and 10, it is unclear how a second digital and control signals correlated with the function of deliberately skew the analog input signal within the first circuit to control filter to control filter tuning to partially compensate for frequency dependent effects associated with a transmission medium. In addition, it is unclear whether "one or more control signals" and "control signals" are the same or not.

Claims 2-8 and 18-20, and 11-17 are also rejected because of depending on independent claims 1 and 10, respectively, containing the same deficiency.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-7 and 9-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cranford, Jr. et al. (US PAT. 5,940,441 hereinafter Cranford) in view of Bickley et al. (US PAT. 5,822,687 hereinafter Bickley).

Regarding claim 1, Cranford discloses an apparatus (100, figure 1) for equalizing a communication signal (112, figure 1), i.e., an analog input, transmitted through a transmission medium (110, figure 1) comprising a first circuit (102, figure 1) for filtering the communication signal in an analog domain in response to one or more control signals (116, figure 1), a second circuit (202, figure 2) for converting the communication signal to a first digital signal, and a third circuit (204, figure 2) configured to generate control signals (210 and 212 figure 2) in response to the first digital signal, wherein the third circuit is configured to adjust the transfer characteristics of the first circuit thereby compensating for loss and distortion of the signal caused by the transmission medium (abstract and col. 3 line 34 through col. 5 line 15). Cranford

differs from the claimed invention in not specifically teaching the third circuit configured to generate a second digital signal and to deliberately skew the analog input signal within the first circuit to control filter tuning to partially compensate for frequency dependent effects. However, Bickley teaches an apparatus for automatic tuning calibration of electrically tuned filters having a circuit (22, figure 1) to generate a second signal (col. 3 lines 34-35), wherein the circuit is configured to deliberately skew the analog input signal within the first circuit to control filter tuning to partially compensate for frequency dependent effects (col. 4 lines 35-44 and col. 5 lines 28-35), thereby providing precise tuning of very narrow bandwidth filters. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Cranford in having the third circuit configured to generate a second digital signal and to deliberately skew the analog input signal within the first circuit to control filter tuning to partially compensate for frequency dependent effects, as per teaching of Bickley, because it improves the apparatus by providing precise tuning of very narrow bandwidth filters.

Regarding claims 2-4, Cranford discloses the third circuit being configured to calibrate the first circuit and to provide back-end digital processing control over the first circuit, wherein the first circuit is configured to provide partial adaptation of the communication signal in the analog domain (col. 2 lines 18-30 and col. 3 lines 57-62).

Regarding claims 5-6, Cranford discloses the first circuit comprising a filter configured to tune the analog input signal and a processor configured to calibrate the filter, wherein the third circuit is configured to offset the filter (col. 3 lines 34-62).

Regarding claim 7, Cranford discloses the first circuit comprising a analog filter (102, figure 1), the second circuit comprising an analog-to-digital conversion circuit (202, figure 2),

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and the third circuit comprising a digital signal processing device (204, figure 2) to generate the control signals.

Regarding claim 9, the limitations of the claim are rejected as the same reasons set forth in claim 1.

Regarding claim 10, the limitations of the claim are rejected as the same reasons set forth in claim 1.

Regarding claim 11, the limitations of the claim are rejected as the same reasons set forth in claims 2-4.

Regarding claims 12-13, the limitations of the claim are rejected as the same reasons set forth in claims 5-6.

Regarding claim 14, Bickley teaches to generate the second digital signal with an adaptive filter-impulse response filter equalizer (col. 2 line 65 through col. 3 line 6 and col. 3 lines 31-38).

Regarding claim 15, Cranford teaches to generate the control signals (V_G , V_C , figure 2) with digital signal processing device (204, figure 2).

Regarding claim 16, Bickley teaches adapting a tuning code of the filter and the filtering and said FIR equalizer with digital processing device to optimize a channel response (col. 3 line 39 through col. 4 line 44).

Regarding claim 17, Bickley teaches to partially adapting the tuning code of the filter device in the analog domain (col. 4 lines 27-44).

Regarding claim 18, the limitations of the claim are rejected as the same reasons set forth in claim 14.

Regarding claims 19-20, Bickley teaches to reduce the dynamic range needed in the analog-to-digital converter circuit by the deliberate skewing of the analog input signal (figure 2 and col. 47-64), wherein the deliberate skewing reduces the number of taps needed in the FIR equalizer circuit (col. 5 lines 18-35).

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cranford, Jr. et al. (US PAT. 5,940,441 hereinafter Cranford) in view of Bickley et al. (US PAT. 5,822,687

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hereinafter Bickley) as applied in claim 1 above, and further in view of English (US PAT. 5,489,879).

Regarding claim 8, Cranford discloses the filter (102, figure 4) comprising a current source, a digital switched capacitor array circuit (C, figure 4), a rectifier (G, figure 4) and an analog-to-digital converter (208, figure 2) to compensate for semiconductor process variations (col. 4 lines 9-27 and col. 7 line 1 through col. 10 line 61). Although the combination of Cranford and Bickley does not specifically disclose the digitally switched capacitor array circuit, the rectifier and the analog-to-digital converter being configured to sweep over code values and determine a center value, it is old and notoriously well known in the art of operating a filter components including the digitally switched capacitor array circuit, the rectifier and the analog-to-digital converter to compensate for frequency-dependent characteristics and provide a high quality subcarrier signal by sweeping over code values and determine a center value, thereby the subcarrier signal produced more closely matches the desired shape and center frequency, for example see English (col. 3 line 42 through col. 5 line 21). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of Cranford and Bickley in having the digitally switched capacitor array circuit, the rectifier and the analog-to-digital converter being configured to sweep over code values and determine a center value, as per teaching of English, because it compensates for frequency-dependent characteristics and provides a high quality subcarrier signal so that the subcarrier signal produced more closely matches the desired shape and center frequency.

Response to Arguments

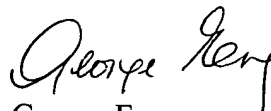
8. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Eng whose telephone number is (571) 272-7495. The examiner can normally be reached on Tue-Fri 7:30 AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A. Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


George Eng
Primary Examiner
Art Unit 2643